Asian Journal of Orthopaedic Research

6(3): 14-19, 2021; Article no.AJORR.76437

Clinical Effectiveness after Intra-Articular Platelet-Rich Plasma (PRP) Injections for Treating Moderate Osteoarthritis of the Knee: A Review of 14 Cases

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

Article Information

Editor(s):
(1) Dr. Midhun Krishnan, SK Hospital, India.
(2) Dr. Parth Trivedi, C.M. Patel College of Physiotherapy, Civil Hospital Campus, India.
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Reviewers:
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(2) Bassel El-Osta, City University, New Mazloum Hospital, Lebanon.
Complete Peer review History: https://www.sdiarticle4.com/review-history/76437

Original Research Article

Received 25 August 2021
Accepted 05 November 2021
Published 09 November 2021

ABSTRACT

Osteoarthritis (OA) is a progressive degenerative disease of articular cartilage. PRP is an alternative therapy indicated especially after failure of conventional treatments. However, it is increasingly finding a place as a first-line treatment for moderate gonarthrosis, and studies are conclusive in this regard.

We report the experience of the military hospital of Laayoune in the practice of this technique through a prospective study of 14 knees in 12 patients during the year 2019.

The present study aimed to evaluate the clinical efficacy of intra-articular PRP injection in patients with moderate gonarthrosis.

Keywords: Osteoarthritis; knee; platelet-rich plasma.

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1. INTRODUCTION

Gonarthrosis is a common disease.It is a pathological and progressive process due to articular destruction of the cartilage of the knee [1-4]. It is a principal cause of handicap in the elderly, and represents a considerable expense for the health system [2,5-6].

In addition to medical treatment, the management of gonarthrosis involves alternative regenerative therapy [7-10]. This is a promising new therapeutic option based on the intra-articular injection of Platelet Rich Plasma (PRP) [2,10-12].

PRP, which contains growth factors, is currently the subject of a therapeutic advance that seems to offer a simple and necessary solution for repairing cartilage tissue [10,13-16].

In this study, we evaluate the effectiveness of these injections in the treatment of moderate gonarthrosis.

2. MATERIALS AND METHODS

We report a prospective study of 14 knees in 12 patients, collected in the department of trauma and orthopaedic surgery of the military hospital of Lâayoune in 12 months [2019]. The study methods were based on the inclusion of patients with minimal to moderate gonarthrosis (stage II and III according to the radiological classification of Kellgren and Lawrence) and failure of medical treatment. Exclusion criteria were: patients under 18 years of age, the presence of a haemostasis or coagulation disorder, patients under anti-coagulant treatment and evolving local or systemic infections.

All patients received alternative PRP therapy after failure of medical treatment combined with physiotherapy. We used the Arthrex double syringe system for PRP preparation. The venous blood sample was 10-15 cc, centrifuged for 6 minutes at speed 15000. The quantity of PRP aspirated was 5 to 8 cc, injected intra-articularly under rigorous aseptic measures at a rate of 2 injections at 3 week intervals. The principle of the study was to collect clinical data before and then at 3 and 6 months after PRP injection.

The evaluation of the results was carried out using the visual analogue score (VAS), based on the intensity of subjective pain which varies from 0 to 10; and the WOMAC score: a functional index which varies from 0 to 96 with three main sections (pain 20 points, functional impotence 8 points and stiffness 68 points). In order to compare our results with those in the literature.

For the statistical analysis of results, SPSS 20.0 was used. Quantitative variables were described using standard variation statistical methods, for which the arithmetic mean (M), standard deviation (δ), 25th and 75th percentiles, and median patient number were calculated. The average values were presented as M + δ. The qualitative variables were described as absolute and relative frequency ratios (percentages). Differences were considered significant at $p< 0.05$. To evaluate results, the statistical analysis methods used was included Analysis of variance for repeated measures and Student's t-test for the post HOC study

3. RESULTS

The demographic and clinical characteristics of the patients included in the study are noted in Table 1.
Before the treatment, patients assessed their pain level as "severe" (VAS 6.9 ± 1). Three then six months following PRP, the pain significantly decreased falling into the "moderate pain" (VAS 4.5 ± 1.6; VAS 4.2 ± 1.9 respectively) (Fig. 1). None of our patients presented complications specific to PRP.

A significant improvement was also observed in the patients' WOMAC score. The average total score before PRP was 65.6 ± 3.7, while at three and then six months after PRP, it significantly decreased to 58.5 ± 5.3 and 57.6 ± 5.9 points, respectively (Fig 1).

Statistical analysis shows that there is a statistically significant difference in the mean of VAS and WOMAC scores before treatment versus 3 months and 6 months ($p < 0.05$). However, there was no statistically significant difference in the mean of VAS and WOMAC between 3 and 6 months (Table 2).

4. DISCUSSION

Gonarthrosis is a degenerative disease of the articular cartilage of the knee [1-4,17]. This disease manifests itself by pain and loss of function [2-5,14,23]. Conventional radiography is a key examination to confirm the diagnosis and to classify the severity of gonarthrosis according to Kellgren and Lawrence [6,8,17,18].

Table 1. Characteristics of the patients who participated in the study

Variables	Values (n=14)
Average age (y.o) [#]	48,1 ± 9,4
Sex [¶]	
- Female	9 (64,3%)
- Male	5 (35,7%)
Side of Knee [¶]	
- Right	7 (50%)
- Left	7 (50%)
Kallgren-Lawrence grade of knee OA [¶]	
- I	0
- II	9 (64,3%)
- III	5 (35,7%)
- IV	0

[#] *Average ± standard deviation*
[¶] *Number (percentage)*

Table 2. Changes in VAS and WOMAC score during the observed phases (N=14 patients)

	Before PRP	At 3 months	At 6 months	*P-value*
VAS [#]	6.9 ± 1 [a]	4,5 ±1.6	4.2 ± 1.9	< 0,001
WOMAC [#]	65.6 ± 3.7 [a]	58.5 ± 5.3	57.6 ± 5.9	< 0,001

[#] *mean ± standard deviation*
[a] *P<0.05: 3 months and 6 months Vs initial (Analysis of variance for repeated measures with post hoc correction)*

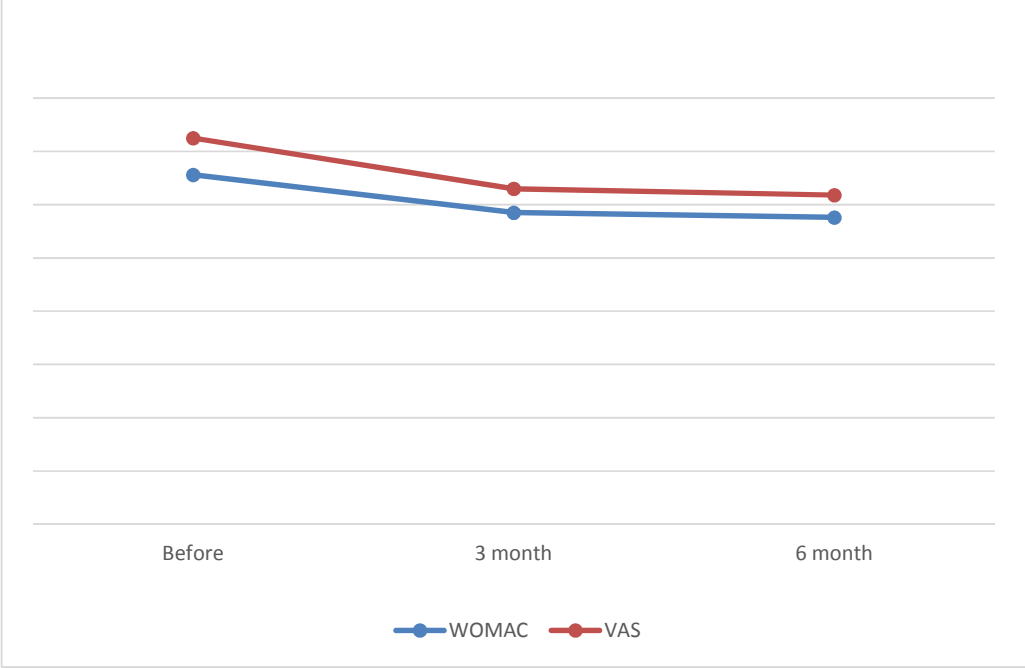

Fig. 1. Index improvements of VAS and WOMAC score throughout the study period

It is not simply a mechanical problem, as osteoarthritis can affect non-weight-bearing joints such as the hand, but it is a biological imbalance including several biological, biochemical and cellular components [1-6,14,19,18,20].

Due to the low self-regenerative capacity of cartilage, the management of moderate gonarthrosis calls for an alternative regenerative therapy, in addition to medical treatment: the

intra-articular injection of Platelet Rich Plasma or PRP [10,15-16].

It is a promising new therapeutic option to promote tissue healing and/or create a favorable biological response [2,11-12,21-24].

PRP is an autologous product obtained by a centrifugation system. This relatively simple technique of gravitational separation of platelets allows the collection of growth factors (CF) from a small amount of the patient's own blood [10,13-16]. The supply of these CFs activates the chondrocytes, promoting neovascularization and collagen synthesis. Injection site pain is the most frequently occurring complication. other risks associated with infiltration are possible but relatively rare, such as infection, hematoma and calcifications [8,10,21-25,19,22]. In our series, there were no complications specific to PRP.
In gonarthrosis, the literature supports its application, especially after failure of conventional treatments. The volume of publications is commensurate with the interest it arouses. Several randomized studies report the clinical benefits [25,19,26-33,18,20].

Our study, conducted over a period of one year, is limited by the size of the sample. Nevertheless, our findings are consistent with many randomized controlled trials in the literature.

Evaluation of our results revealed a statistically significant reduction in pain based on the VAS score. A significant improvement was also observed in the patients' WOMAC score. We found a clinical improvement at three months after PRP injection; while at six months the result was almost similar to three months.

5. CONCLUSION

PRP remains a topical therapy applied in various fields. In gonarthrosis, this treatment is simple, natural and inexpensive.

CONSENT AND ETHICAL APPROVAL

As a per international standard or university standard guideline, patients' consent and ethical approval has been collected and preserved by the authors.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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Peer-review history:
The peer review history for this paper can be accessed here:
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